



Sustainable Design & Greening Issues: Department of Defense

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Department of Defense: Sustainable Design Efforts

- Pentagon Charrette: Sustainable Design Showcase (1994)
- Policies
- Individual Projects
- Training: Sustainable Design Regime
- Base-wide “Greening”





Department of Defense: Sustainable, Green, High Performance...

- **DEFINE**
 - Upfront goals
 - Energy Star
 - LEED
 - SPIRIT
- **IMPLEMENT**
 - Process
 - Buildings
 - Bases
- **ASSESS**
 - Documentation/ Indicators






DEFINE: What Is Green?

- **Energy Star**
www.energystar.gov/
- **LEED (Version 2.0 March 2000)**
www.leedbuilding.org
- **SPiRiT (Version 1.4 April 2001)**
www.cecer.army.mil/SustDesign

LEED™ Scorecard



Purpose of Form: Use this form to score your project against the LEED™ Green Building Rating System. Fill it out at the time of registration. It will help you, and us, to keep track of the prerequisites and applicable credits on your project. It will also be used to track compliance when that documentation is submitted to the US Green Building Council.

☐ **14 Sustainable Sites**

☐ Prerequisite: Erosion and Sedimentation Control
☐ Credit 1: Site Selection
☐ Credit 2: Urban Redevelopment
☐ Credit 3: Brownfield Redevelopment
☐ Credit 4: Alternative Transportation
☐ Credit 5: Reduced Site Disturbance
☐ Credit 6: Stormwater Management
☐ Credit 7: Landscape and Exterior Design to Reduce Heat Islands
☐ Credit 8: Light Pollution Reduction

☐ **5 Water Efficiency**

☐ Credit 1: Water Efficient Landscaping
☐ Credit 2: Innovative Wastewater Technologies
☐ Credit 3: Water Use Reduction

☐ **17 Energy and Atmosphere**

☐ Prerequisite 1: Fundamental Building Systems Commissioning
☐ Prerequisite 2: Minimum Energy Performance
☐ Prerequisite 3: CFC Reduction in HVAC&R Equipment
☐ Credit 1: Optimize Energy Performance
☐ Credit 2: Renewable Energy
☐ Credit 3: Additional Commissioning
☐ Credit 4: Elimination of HCFC's and Halons
☐ Credit 5: Measurement and Verification
☐ Credit 6: Green Power

☐ **13 Materials and Resources**

☐ Prerequisite: Storage & Collection of Recyclables
☐ Credit 1: Building Reuse
☐ Credit 2: Construction Waste Management
☐ Credit 3: Resource Reuse
☐ Credit 4: Recycled Content
☐ Credit 5: Local/Regional Materials
☐ Credit 6: Rapidly Renewable Materials
☐ Credit 7: Certified Wood

☐ **15 Indoor Environmental Quality**

☐ Prerequisite 1: Minimum IAQ Performance
☐ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control
☐ Credit 1: Carbon Dioxide (CO2) Monitoring
☐ Credit 2: Increase Ventilation Effectiveness
☐ Credit 3: Construction IAQ Management Plan
☐ Credit 4: Low-Emitting Materials
☐ Credit 5: Indoor Chemical and Pollutant Source Control
☐ Credit 6: Controllability of Systems
☐ Credit 7: Thermal Comfort
☐ Credit 8: Daylight and Views

☐ **64 Total Core LEED Rating System Points**

☐ **5 Innovation and Design Process Points**

☐ LEED Innovation Credits
☐ LEED Accredited Professional

☐ **Total Points Scored**

LEED Green Building Certification Levels

LEED Certified = 26 - 32 Points
 LEED Certified Silver Level = 33 - 38 Points
 LEED Certified Gold Level = 39 - 51 Points
 LEED Certified Platinum Level = 52+ Points

LEED Green Building Rating System™ Version 2.0 Final Page 25



DEFINE...

Military Considerations

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- IEQ
- Facility Delivery Process
- Current Mission
- Future Missions





Sustainable Sites

- Erosion, Sediment, and Water Control
- Site Selection
- Base Urban Redevelopment
- Brownfield Redevelopment
- Alternative Transportation
- Reduced Site Disturbance
- Stormwater Management
- Reduce Heat Islands
- Light Pollution Reduction
- Optimize Site Features
- Facility Impact/ Site Ecology





Water Efficiency

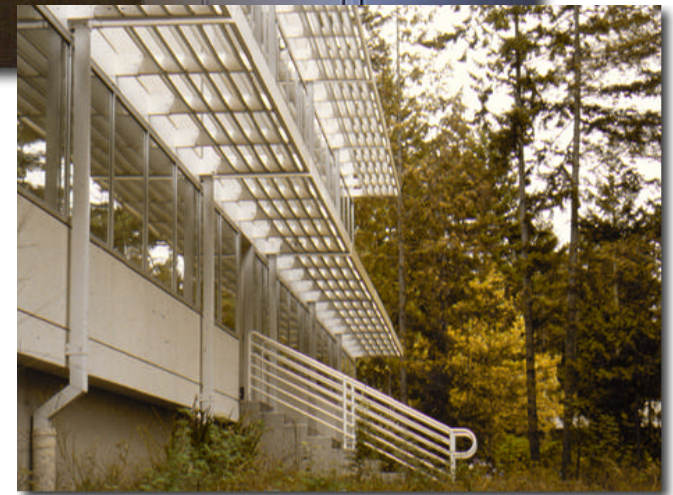
- Water Efficient Landscaping
- Innovative Wastewater Technologies
- Water Use Reduction





Energy & Atmosphere

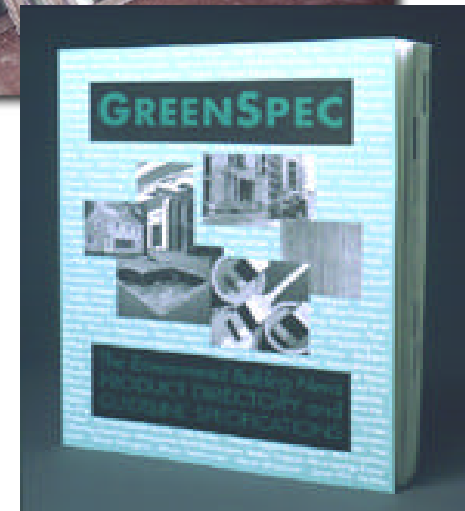
- Fundamental Commissioning
- Minimum Energy Performance
- CFC Reduction in HVAC & R Equipment
- Optimize Energy Performance
- Renewable Energy
- Additional Commissioning
- Measurement and Verification
- Green Power
- Distributed Generation





Materials & Resources

- Storage and Collection of Recyclables
- Building Reuse
- Construction Waste Mgmt
- Resource Use
- Recycled Content
- Local/ Regional Materials
- Rapidly Renewable Materials
- Certified Wood





Indoor Environmental Quality

- Minimum IAQ Performance
- No Smoking
- Carbon Dioxide Monitoring
- Ventilation Effectiveness
- Construction IAQ Management
- Low-emitting Materials
- Indoor Pollutants
- System Controllability
- Thermal Comfort
- Daylight & Views
- Acoustic Environment/Noise Control
- Facility In-Use IAQ Management Plan





Life-Cycle Sustainability

- Facility Delivery Process

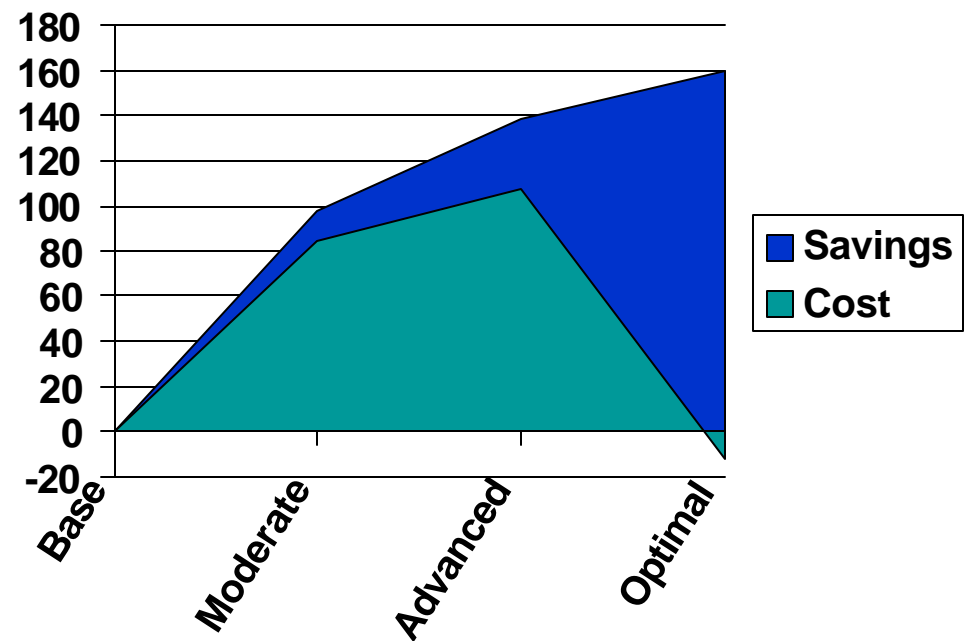
- Holistic Process
- Performance Measurement
- Charrettes

- Current Mission

- Design for O & M
- Design for Productivity

- Future Mission

- Assess life spans
- Design for Reuse





Facility Delivery Process

- Holistic Process Optimizes

- Sustainability
- First and Life Cycle Costs
- Mission

- Through...

- Team training
- Stakeholders Involvement
- Charrettes
- Performance Measurement





Current Mission

- Design for O&M
 - Commissioning Instructions
 - O & M Protocols
 - Training Programs
 - Low-impact practices
- Design for productivity and retention
 - Retain staff through QOL
 - Functionality
 - Safe and healthy





Future Mission

- Assess/ predict life spans of:

- Current Use
- Building Systems

- Design for Reuse:

- Understand future options
- Accommodate future uses
- Minimize future demolition





IMPLEMENT

**DOD High Performance Facilities
(Green/Sustainable) use an *Integrated
Design Approach* with a focus on...**

- **Multidisciplinary teams**
- **Up-front environmental goals**
- **Champions**
- **Whole systems approach**
- **Follow-through**



IMPLEMENT... Multidisciplinary Teams

- Engage all team members early in the process –
- Owner, users, designers, facility managers, spec writers, interior designers, etc.
- Look for diversity of team members



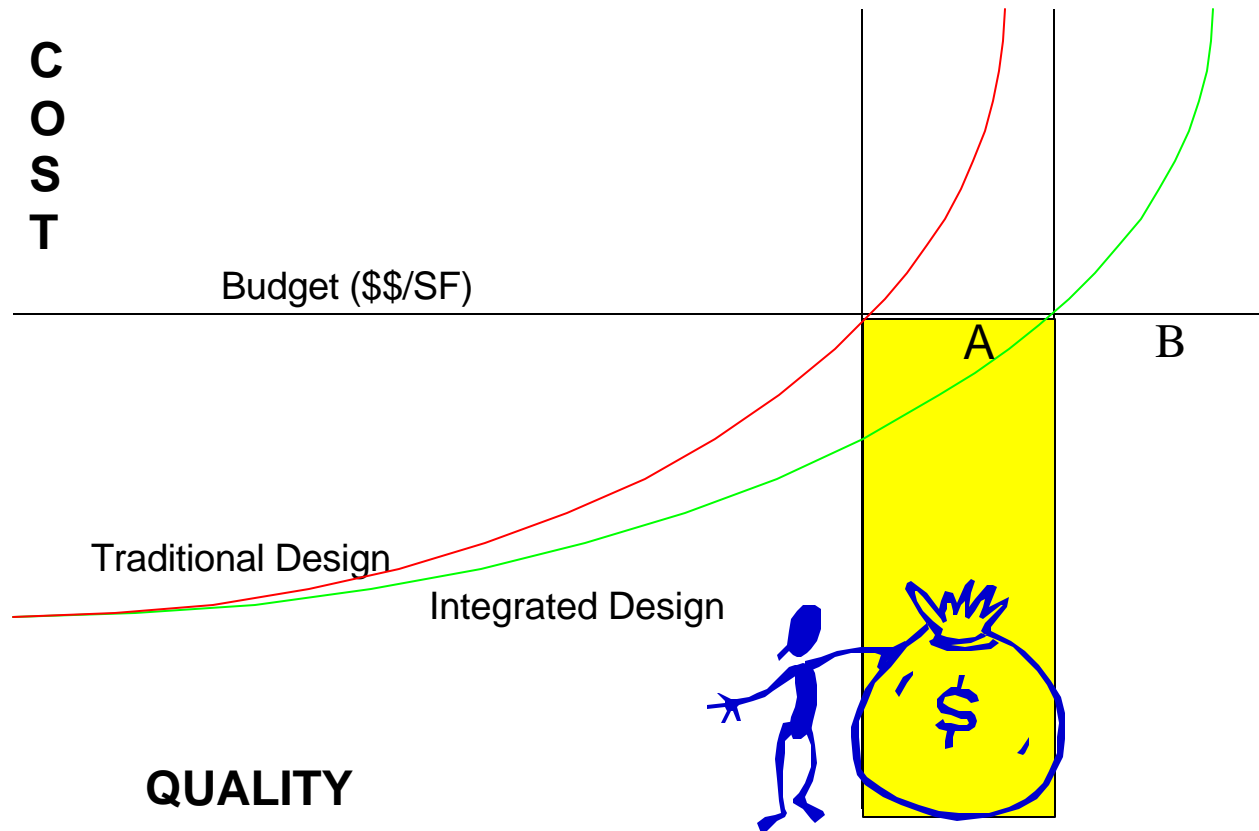


IMPLEMENT... Up-front Environmental Goals

- **Clarify goals and design expectations early**
- **All 1391s will require adaptation of sustainable principles**
- **Explicitly identify methods for measuring goals and targets**
- **Confirm that goals and targets are being met at each stage of the project – 50%, 90%, and FINAL**



IMPLEMENT... Up-front Environmental Goals





IMPLEMENT... Champions

- **Connect Champions with Environmental Goals**
- **Identify Champions as responsible parties**
- **Encourage Champions to increase their Knowledge base of “Lessons Learned”**





IMPLEMENT... Whole Systems Approach



- Omit perimeter heating/ cooling
- Downsize HVAC
- Reduce ductwork (materials)
- Use daylighting
- Control heat gain and glare



IMPLEMENT... Follow-through

- **Documentation of goals**
- **Specs, drawings, etc.**
- **Data collection**
- **Commissioning**
- **Benchmarks**
- **Ongoing Education**
- **Metering & Monitoring**





IMPLEMENT

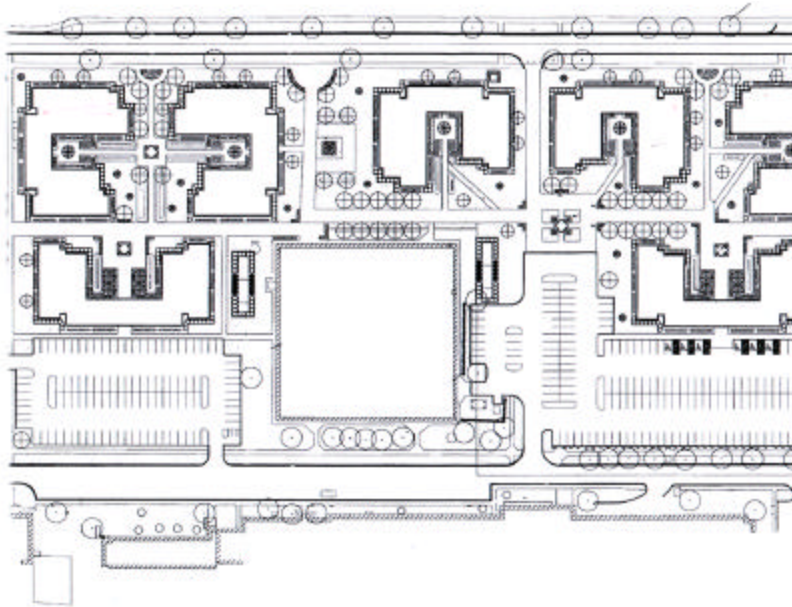
- **Energy Star
Ft. Lee Housing**





IMPLEMENT

- **LEED Green Building Rating System**
 - **NAVY: Great Lakes BEQ**





IMPLEMENT

- **SPIRiT (Sustainable Project Rating Tool)**
 - **ARMY Fitness Center: Columbus, Ohio**
- **Base - Wide Initiatives**
 - **Air-Force “Green Base of the Future”**
 - **NAVY Green Charrette: Millington, TN (2000)**
 - **Site & Water**
 - **Energy**
 - **Resource Conservation**
 - **Operations and Maintenance**
 - **Big Picture: Community and Base Partnerships**



ASSESS

- Document throughout the design & construction process (pre- & post-occupancy)
- Keep an ongoing organized notebook
- Schedule regular “check-ups” for ongoing assessment of goals
- Assess project over the long-term...





Department of Defense

Sustainable Design and Greening Issues

- **Know where you are.**
- **Set targets and define goals for what you want to achieve...**
- **Identify the best tools and strategies for achieving your stated goals in an integrated manner.**
- **Document your achievements and promote improvement over time!**
 - **“If you don’t know where you are going, any road will take you there.”**

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Alice in Wonderland



THANK YOU!